Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Form PCT/IPEA/416
2003P02286WO		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/EP2004/050569	20.04.2004	17.07.2003

International Patent Classification (IPC) or national classification and IPC

F02D41/14, F02D41/24

Applicant

SIEMENS AKTIENGESELLSCHAFT

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 3 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))

      _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/050569

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

☐ international search (Rule 12.3 and 23.1(b))

☐ publication of the international application (Rule 12.4)

☐ international preliminary examination (Rule 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ the international application as originally filed/furnished

☒ the description:

pages 1-20 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

nos. _____ as originally filed/furnished

nos.* _____ as amended (together with any statement) under Article 19

nos.* 1-9 received by this Authority on 07.04.2005 with letter of 06.04.2005

nos.* _____ received by this Authority on _____

☒ the drawings:

sheets 1/2, 2/2 as originally filed/furnished

sheets* _____ received by this Authority on _____

sheets* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/050569

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-9	YES
	Claims		NO
Inventive step (IS)	Claims	1-9	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-9	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Reference is made to the following documents:

D1: WO 97/35106

D2: DE 197 05 766

1 Independent claim 1

Document D1 shows a method for regulating an internal combustion engine according to one or more physical models,
measured values and manipulated variables being provided as system variables underlying the physical model, in order to operate the internal combustion engine according to a control system,
it being possible to apply one or more adaptation values ($\Delta\hat{A}_{RDK}$, $\Delta\hat{A}_{RRG}$, ΔP_A) to each system variable in order to adapt the physical model to the actual states of the internal combustion engine,
a first estimated variable (m_{DK}) being determined using a first system variable and/or a second system variable and/or a third system variable,
a second estimated variable (P_s) being determined using the first system variable and/or second

system variable and/or third system variable,
a first measured variable being determined in a measurement of a physical variable underlying the first estimated variable and a second measured variable being determined in a measurement of a physical variable underlying the second estimated variable,
the first measured variable being evaluated with respect to the first estimated variable and the second measured variable with respect to the second estimated variable,
a first adaptation value for the first system variable being determined using the first measured variable (*see page 21, lines 28-31: "the difference between the measured variable and the model variable of the determined mass flow ... is used ... to calculate the correction value* $\Delta\hat{A}_{RDK}$"),
a second adaptation value for the second system variable being determined in a first operating mode using the second measured variable (*see page 22, lines 1-4: "the difference between the determined measured variable and the corresponding model variable of the induction manifold pressure is used to calculate a correction value* $\Delta\hat{A}_{RRG...}$").

The subject matter of claim 1 differs from the method described in D1 in that a second operating mode is adopted as a function of the first and second adaptation values, the second adaptation value for the second system variable being reset in the second operating mode and the third adaptation value for the third system variable

Box No. V — Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

being determined using the second measured variable.

The invention addresses the problem of associating deviations between the estimated variables and the measured variables with that system variable which is also physically responsible for the deviation, when using a limited number of sensors, i.e. with fewer measured variables than system variables. This is achieved as per claim 1 in that a parameter for the second system variable (flow cross-section in the intake section) is experimentally adapted in the first operating mode and then a check is made using the first **and** second adaptation values to see whether the correct system variable was adapted. If this is not the case, the adaptation of the second system variable is reset in the second operating mode and instead the third system variable (absorption behaviour of the engine) is adapted using the second measured variable. This procedure is neither disclosed nor suggested by the cited prior art.

Claim 1 is thus novel and inventive (PCT Article 33(2) and (3)) The same applies to claims 2-9, which are dependent on claim 1.